

NEW CALIPYRGULA FROM PLEISTOCENE OF TEXAS  
AND NOTES ON COCHLIOPA RIOGRANDENSIS

BY A. B. LEONARD AND TONG-YUN HO

Continued studies of the large assemblages of fossil shells from Pleistocene deposits in the Pecos River Valley in southwestern Texas, jointly sponsored by The University of Texas Bureau of Economic Geology and The National Science Foundation (contract number NSF-G3481), have brought to light another undescribed species, here assigned to the genus *Calipyrgula* for reasons which were discussed in a previous paper (Leonard and Ho, 1960). In the course of these studies, both fossil and living examples of *Cochliopa riograndensis* Pilsbry and Ferriss were obtained. We also include in this paper our observations on this little-known species.

*CALIPYRGULA CIRCUMSTRIATA*, new species. Plate 12, figs. 1-3

*Diagnosis:* A minute hydrobiid gastropod, having an elongate, narrowly conic, imperforate, or narrowly rimate shell of 6 or 7 rounded whorls; aperture small, ovate, slightly angulate above; peristome simple, slightly reflected over minute umbilicus and adherent to last whorl above; suture simple, well incised; protoconch finely granulose, remaining whorls generally bearing 5 or more narrow spiral ridges of somewhat irregular size and spacing.

*Calipyrgula circumstriata* closely resembles *C. hibbardi* Leonard and Franzen (1944, p. 19), but the latter lacks the surface sculpture characteristic of *C. circumstriata*. It differs from *C. pecosensis* Leonard and Ho (1960, p. 110) in having fewer whorls, less slender form, and spiral sculpture. From species of *Tryonia*, *C. circumstriata* differs by having spiral, rather than vertical sculpture, and by having well-rounded, rather than shouldered whorls.

*Holotype:* (Pl. 12, Fig. 1) Catalogue no. 11301, University of Kansas Museum of Natural History, obtained by A. B. Leonard and Tong-yun Ho, 4 June, 1959. Original no.: ABL 1004.

*Description of holotype:* Shell minute (less than 5 mm. in length), narrowly conic, imperforate, having 7 well-rounded whorls; aperture ovate, narrower and angulate above; peristome simple, slightly reflected over umbilicus and adherent to last whorl above; protoconch of one and one-half whorls finely granulose, remaining whorls bearing narrow, somewhat irregularly spaced spiral ridges ranging in number from 3 on second whorl

to 12 on last; last three whorls having a few indistinct vertical ridges crossing spiral sculpture; extremely fine and numerous vertical growth lines apparent on all whorls save protoconch; suture simple, well incised.

*Paratypes*: No. 11302, UKMNH. (Plate 12, figures 2, 3). Considerable variation occurs among the several hundred paratypes from the same locality; the extremes are illustrated. Fig. 2 exemplifies the obsolescence of the spiral lines on some shells, while fig. 3 shows another extreme, but relatively rare, variation in which vertical ridges are conspicuously developed. Intergradation occurs among the variants; most shells, however, closely resemble the holotype. Variations in dimensions are illustrated by the following measurements, in millimeters.

	<i>Length</i>	<i>Diameter</i>	<i>Height aperture</i>	<i>Diameter aperture</i>	<i>No. of whorls</i>
Holotype	4.9	2.1	1.5	1.2	7
Paratype (fig. 2)	4.3	1.8	1.3	1.0	6½
Paratype (fig. 3)	3.7	1.4	1.2	0.7	6

Paratypical specimens have been deposited at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, and at the United States National Museum, Washington, D. C.

*Type locality*: Late Pleistocene terrace deposits in right bank of Pecos River, one-fourth mile above mouth of Independence Creek, on Chandler Ranch, Terrell County, Texas.

*Areal and stratigraphic distribution*: We found *Calipyrghula circumstriata* at: the type locality; on W. C. Dunlap Ranch, about 12 miles south-southeast of Sheffield, in Terrell County; and near bridge on U. S. Highway 290, 3 miles southeast of Sheffield, Pecos County, Texas. At the last mentioned locality, a single specimen of *C. circumstriata* was found associated with *C. pecosensis*, although the latter species occurs abundantly in the late Pleistocene terrace along the Pecos River, as far north as northern Reeves County (Leonard and Ho, 1960, p. 112).

Each of the three localities of occurrence of *C. circumstriata* is in the late Pleistocene terrace in which the Pecos River is presently shallowly entrenched.

Inasmuch as *C. circumstriata* has been found in deposits along the Pecos only at places where that river has begun its entrench-

ment in Cretaceous rocks as it approaches the deeply entrenched Rio Grande, we may infer that *C. circumstriata* inhabited the clear, cool, rocky streams characteristic of certain tributaries (such as Independence Creek) of the Pecos River. This inference is strengthened by the observation that at the Chandler Ranch (type) locality, *C. circumstriata* occurs with fossil *Cochliopa riograndensis* Pilsbry and Ferriss; the latter is presently living in Independence Creek. Efforts to find living *C. circumstriata* have not been successful.

COCHLIOPA RIOGRANDENSIS Pilsbry and Ferriss. Pl. 12, figs. 4-7, text figs. 1-4.

Pilsbry and Ferriss (1906, p. 171) described *Cochliopa riograndensis* from shells found at two localities near the Rio Grande, Val Verde County, Texas. The original description was based on "dead" specimens taken from drift debris. For this reason, they gave no information about habitat, or about anatomical details of radula and operculum. To our knowledge, neither the radula nor the operculum has been described and figured. We deem it advisable, therefore, to contribute our observations to a further knowledge of this little-known species.

Shortly after the discovery of fossil shells of *C. riograndensis* (UKMNH. no. 11343) at the type locality of *Calipyrgula circumstriata*, we found nearly 30 specimens of living *C. riograndensis* in Independence Creek, near the bridge on Texas Highway 349, about 16 miles south of Sheffield, in Terrell County, Texas (UKMNH. no. 11636, 4 June, 1959, original no. TYH 30) and no more than a mile from the place where the fossil shells were collected. The snails were living in relatively sluggish water about six inches deep in the clear, cool, fast-flowing stream. *C. riograndensis* was here restricted to the edge of the stream, and was fairly abundant under cobbles of limestone, logs, and in aquatic vegetation. Associated with *C. riograndensis* were *Lymnaea bulimoides techella* (Haldeman), *Gyraulus similaris* (Baker), *Physa anatina* Lea, and *Ferrissia shimekii* (Pilsbry). To our knowledge, this occurrence of *C. riograndensis* is a northern extension of its previously known range.

*Operculum* (Pl. 13, fig. 1): Horny, thin, roundly ovate, all sides regularly rounding upward to a semiarculate apex; whorls 5, the last about triple the width of penultimate whorl, inner

whorls narrower and increasing regularly in width; sculpture consisting of coarse unequidistant, obliquely radiating growth lines crossed by very fine spiral lines that are visible only on the last half of the last whorl; nucleus small, circular, more or less granular, placed about  $6/13$  the distance from base to apex, somewhat toward the left side; attachment to operculigerous lobe indicated by a thickening about a third of the distance from border to nucleus; thickening raised above the general level of the operculum; greater diameter from 0.8 millimeters to 1.3 millimeters.

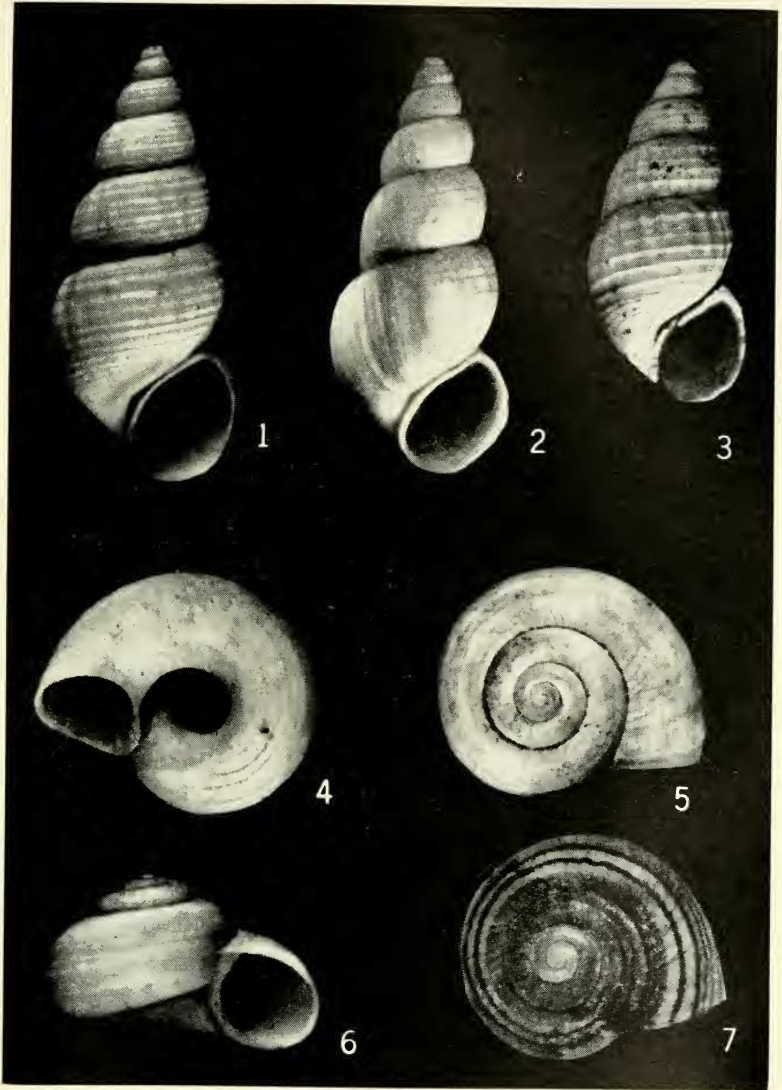
Measurement of figured specimen: greater diameter, 1.3 mm.; lesser diameter 1.1 mm.

*Radula* (Pl. 13, figs. 2, 3, 4): Central tooth (fig. 2): Width about twice height; lateral angles produced and sharply triangular; ventral margin having large, triangular process extending from base; lateral ridge large, wide, having two basal denticles, anterior one larger than posterior; reflection wide and low, having 11 sharply elongate cusps, central cusp about three times as wide as lateral cusps, reaching nearly  $2/3$  distance from dorsal margin to ventral margin; lateral cusps smaller, gradually increasing in size toward center. Lateral tooth (fig. 3): Body slightly wider than high, having sharply rounded lobe extending from inner basal part of body; large, U-shaped, pit-like depression in center of body; peduncle almost twice as long as body, gradually narrowing toward end, having elongate ridge parallel with long axis, but displaced toward outer margin; reflection wide and low, bearing two inner cusps, one large central cusp and four outer cusps, all cusps sharply elongated and diminishing in size toward margin of tooth. Inner marginal tooth (fig. 4): Falcate, having long and narrow body; peduncle spatulate, less than twice length of body, bearing elongate centrally placed ridge parallel to long axis and branching near base of body; reflection wide and low, bearing 20 to 30 fine, sharply elongate cusps; cusps near central portion of reflection relatively large and acute, those on lateral margin becoming smaller.

Measurements of figured radula in microns

Central tooth. Width .....	32
Height .....	16
Length of cusp row .....	20
Lateral tooth. Height .....	58
Length of cusp row .....	20
Marginal tooth. Height .....	51
Length of cusp row .....	24

We found no significant differences between the fossil shells of *Cochliopa riograndensis* (Pl. 12, figs. 4, 5, 6), and those from living individuals (Pl. 12, fig. 7). The spiral color bands on



Figs. 1-3, *Calipyrgula circumstriata* Leonard & Ho: 1, holotype shell. 2, 3, paratypes from same locality, to show extremes of variation in size, proportions and surface sculpture. Figs. 4-7, *Cochliopa riograndensis* Pilsbry & Ferriss: 4-6, fossil shells. 7, apical view of shell from living animals.